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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/806,417	07/25/2001	Toshihide Sekido	360842007500	8675

7590 12/14/2004

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EXAMINER	
STAICOVICI, STEFAN	
ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/806,417	SEKIDO ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,32-43 and 46-50* is/are pending in the application.

4a) Of the above claim(s) *1-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-28,32-43 and 46-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

2. Applicants' After-Final amendment filed December 2, 2004 has been entered. Claims 26 and 28 have been amended. Claims 29-31 and 44-45 have been canceled. Claims 1-28, 32-43 and 46-50 are pending in the instant application.

Election/Restrictions

3. This application contains claims 1-25 drawn to an invention nonelected without traverse in the reply filed on April 23, 2003. Claims 1-25 remain withdrawn from consideration.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 28 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calapp *et al.* (US Patent No. 5,746,955) in view of Darrieux *et al.* (US Patent No. 5,571,357).

Calapp *et al.* ('955) teach the claimed process for forming a non-circular, hollow fiber-reinforced structure including, providing a non-circular mandrel (35), placing said mandrel between spindles (32, 33) on a winding machine and winding a plurality of fibers around said mandrel (35) to form a wound mandrel, placing said wound mandrel in a mold cavity defined between mold halves (39, 40), applying a vacuum to said mold cavity, injecting a resin into said mold cavity to impregnate said fibers and curing said resin to form said non-circular, hollow fiber-reinforced structure (see col. 7, lines 23-34; col. 8, lines 33-40; col. 9, lines 4-31).

Regarding claim 28, Calapp *et al.* ('955) do not teach that the reinforcing fiber does not extend continuously for two laps of a circumference of the inner mold. Darrieux *et al.* ('357) teach a process for making fiber composite hollow objects including, winding fibers around an internal mandrel such that said winding is not continuously for two laps of a circumference of the inner mold such that a partial covering of the inner mandrel results (see col. 2, lines 22-27; col. 6, line 1 through col. 7, line 12 and, Figures 9b-9f). Further, it is noted that Darrieux *et al.* ('357) teach the use of pieces of fabric (see Figure 9f and col. 6, line 45 through col. 7, line 5). Therefore, it would have been obvious for one of ordinary skill in the art to have wound fibers around an internal mandrel such that said winding is not continuously for two laps of a circumference of the inner mold as taught by Darrieux *et al.* ('357) in the process of Calapp *et al.* ('955) because, Darrieux *et al.* ('357) specifically teach that such an arrangement allows for full radial expansion of the wound fibers by the inner mandrel, hence providing for uniform pressure to be

applied and hence, forming an improved molded product having an improved surface finish (see col. 7, line 65 through col. 8, line 4).

Specifically regarding claim 41, Calapp *et al.* ('955) teach removal of said non-circular mandrel (35) (see col. 9, lines 37-47).

6. Claims 26-28, 32-33, 37, 41, 46 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/32589 in view of Nelson *et al.* (US Patent No. 5,985,197) and in further view of Darrieux *et al.* (US Patent No. 5,571,357).

WO 98/32589 teaches the basic claimed process for forming a non-circular, hollow fiber-reinforced structure including, providing an inner mold (mandrel) (40) and an elastomeric bladder (42) onto a stand, winding a plurality of fiber-reinforced layers onto said inner mold (mandrel) (40) by wrapping a plurality of fibers to form a wrapped assembly, placing a vacuum bag (100) around said wrapped assembly to form a bagged assembly, drawing a vacuum onto said bagged assembly and curing said fiber-reinforced layers under conditions of pressure and temperature (see Abstract and pages 21-22).

Regarding claim 26, WO 98/32589 does not teach resin injection. Nelson *et al.* ('197) teach a molding process for forming a non-circular, hollow fiber-reinforced structure including, providing an inner mold, covering said inner mold with an elastomeric bladder, placing a plurality of fiber-reinforced layers onto said bladder by wrapping a plurality of fibers to form a wrapped assembly, placing said wrapped assembly into a mold and curing said fiber-reinforced layers under conditions of pressure and temperature (see Abstract). Further, Nelson *et al.* ('197) teach that resin impregnation of a fiber occurs before or after placement of said fibers in said mold, hence

teaching that resin injection and resin pre-impregnation are equivalent alternatives. Therefore, it would have been obvious for one of ordinary skill in the art to have provided resin impregnation after placing a fiber-reinforced layer in a mold as taught by Nelson *et al.* ('197) in the process of WO 98/32589 because, Nelson *et al.* ('197) specifically teach that resin injection and resin pre-impregnation are equivalent alternatives to providing a resin to a fiber reinforced structure.

Further regarding claim 26, WO 98/32589 in view of Nelson *et al.* ('197) do not teach that the reinforcing fiber does not extend continuously for two laps of a circumference of the inner mold. Darrieux *et al.* ('357) teach a process for making fiber composite hollow objects including, winding fibers around an internal mandrel such that said winding is not continuously for two laps of a circumference of the inner mold such that a partial covering of the inner mandrel results (see col. 2, lines 22-27; col. 6, line 1 through col. 7, line 12 and, Figures 9b-9f). Further, it is noted that Darrieux *et al.* ('357) teach the use of pieces of fabric (see Figure 9f and col. 6, line 45 through col. 7, line 5). Therefore, it would have been obvious for one of ordinary skill in the art to have wound fibers around an internal mandrel such that said winding is not continuously for two laps of a circumference of the inner mold as taught by Darrieux *et al.* ('357) in the process of WO 98/32589 in view of Nelson *et al.* ('197) because, Darrieux *et al.* ('357) specifically teach that such an arrangement allows for full radial expansion of the wound fibers by the inner mandrel, hence providing for uniform pressure to be applied and hence, forming an improved molded product having an improved surface finish (see col. 7, line 65 through col. 8, line 4).

In regard to claims 27 and 46, WO 98/32589 teaches curing at a temperature of 350 °F (50-200 °C) (see page 33).

Specifically regarding claim 28, WO 98/32589 teaches the use of a vacuum bag (100) and clam shells (30, 32).

In regard to claims 32-33, WO 98/32589 teaches a hollow mandrel that allows a fluid to be transported through said mandrel and expelled through a plurality of orifices (40e) to force an elastomeric bladder positioned over said mandrel outward against the interior surface of clam shells (30, 32) (see page 13). Further, regarding claim 33, WO 98/32589 teaches air under pressure of 15 psi (0.1 Mpa) (see page 21).

Specifically regarding claim 37, WO 98/32589 teaches an elastomeric bladder as an inner mold.

Regarding claim 41, WO 98/32589 teaches removing the mandrel (see pages 30-31).

In regard to claim 50, WO 98/32589 teaches a fabric (woven mat) pre-preg (see page 11, line 12). It is noted that Darrieux *et al.* ('357) teach the use of pieces of fabric (see Figure 9f and col. 6, line 45 through col. 7, line 5).

7. Claims 28, 32, 37-38, 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway (US Patent No. 5,080,850) in view of Calapp *et al.* (US Patent No. 5,746,955) and in further view of Darrieux *et al.* (US Patent No. 5,571,357).

Holloway ('850) teaches the basic claimed process for molding a non-circular, hollow fiber-reinforced structure including, blow-molding a core, winding a plurality of fibers around said core, placing said wrapped core in a mold, drawing a vacuum in said

mold while collapsing said core and injecting a resin into said mold to impregnate said fibers, curing said resin under heat and pressure by re-expanding said core (see col. 3, line 50 through col. 5, line 55).

Regarding claim 28, although Holloway ('850) teaches winding a plurality of fibers around said core, Holloway ('850) does not teach a stand. Calapp *et al.* ('955) teach a process for forming a non-circular, hollow fiber-reinforced structure including, providing a non-circular mandrel (35), placing said mandrel between spindles (32, 33) on a winding machine and winding a plurality of fibers around said mandrel (35) to form a wound mandrel, placing said wound mandrel in a mold cavity defined between mold halves (39, 40), applying a vacuum to said mold cavity, injecting a resin into said mold cavity to impregnate said fibers and curing said resin to form said non-circular, hollow fiber-reinforced structure (see col. 7, lines 23-34; col. 8, lines 33-40; col. 9, lines 4-31). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a winding machine having spindles (stand) as taught by Calapp *et al.* ('955) in the process of Holloway ('850) because Holloway ('850) specifically teaches winding a plurality of fibers around a core, whereas Calapp *et al.* ('955) teaches that a winding machine having spindles allows winding a plurality of fibers around a core and also because both references teach similar materials and processes.

Further regarding claim 28, Holloway ('850) in view of Calapp *et al.* ('955) do not teach that the reinforcing fiber does not extend continuously for two laps of a circumference of the inner mold. Darrieux *et al.* ('357) teach a process for making fiber composite hollow objects including, winding fibers around an internal mandrel such that

said winding is not continuously for two laps of a circumference of the inner mold such that a partial covering of the inner mandrel results (see col. 2, lines 22-27; col. 6, line 1 through col. 7, line 12 and, Figures 9b-9f). Further, it is noted that Darrieux *et al.* ('357) teach the use of pieces of fabric (see Figure 9f and col. 6, line 45 through col. 7, line 5). Therefore, it would have been obvious for one of ordinary skill in the art to have wound fibers around an internal mandrel such that said winding is not continuously for two laps of a circumference of the inner mold as taught by Darrieux *et al.* ('357) in the process of Holloway ('850) in view of Calapp *et al.* ('955) because, Darrieux *et al.* ('357) specifically teach that such an arrangement allows for full radial expansion of the wound fibers by the inner mandrel, hence providing for uniform pressure to be applied and hence, forming an improved molded product having an improved surface finish (see col. 7, line 65 through col. 8, line 4).

In regard to claim 32, Holloway ('850) teach a hollow, flexible inner mold that is pressurized (expanded) during curing.

Specifically regarding claim 37, Holloway ('850) teach a plastic inner mold.

Regarding claims 38 and 43, Holloway ('850) teaches joining under vacuum a plurality of fiber reinforced structures to form an integral component (see Figure 7).

In regard to claim 40, Holloway ('850) teach a blow-molded inner mold.

Specifically regarding claims 41-42, Holloway ('850) teach that the inner mold is removed from the resulting structure or is left as an integral component of said fiber reinforced structure (see col. 5, line 67 through col. 6, line 2).

8. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway (US Patent No. 5,080,850) in view of Calapp *et al.* (US Patent No. 5,746,955) and in further view of Darrieux *et al.* (US Patent No. 5,571,357) and Johnson *et al.* (US Patent No. 5,169,590).

Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) teach the basic claimed process as described above.

Regarding claim 34, Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) do not teach an inner mold having grooves molded therein. Johnson *et al.* ('590) teach a molding process including, providing a blow-molded core (10') having a plurality of grooves (26) molded therein, wrapping said core with fiberglass tows (36) and placing said wrapped core in a mold while injecting a resin that flows along grooves (26) to impregnate said fiberglass tows (36) (see col. 2, line 46 through col. 3, line 24). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a plurality of grooves as taught by Johnson *et al.* ('590) in the core in the process of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) because, Johnson *et al.* ('590) specifically teaches that such grooves allow for a rapid and uniform impregnation, hence forming an improved product (see col. 3, lines 20-25) and also because, both Johnson *et al.* ('590) and Calapp *et al.* ('955) teach blow molded cores used in a resin transfer molding process to form a non-circular, hollow fiber-reinforced structure.

9. Claims 34-36, 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway (US Patent No. 5,080,850) in view of Calapp *et al.* (US Patent No.

5,746,955) and in further view of Darrieux *et al.* (US Patent No. 5,571,357) and Tunis, III *et al.* (US Patent No. 6,159,414).

Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) teach the basic claimed process as described above.

Regarding claims 34-36, Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) do not teach a resin distribution medium. Tunis, III *et al.* ('414) teach a molding process including, providing a core, wrapping said core with fiber-reinforced material to form a wrapped core, wrapping said wrapped core in a vacuum bag assembly, drawing a vacuum and injecting a resin into said bag to form a fiber reinforced article (see Abstract). Further, Tunis, III *et al.* ('414) teach alternative methods of distributing resin, specifically forming grooves in the core or providing an open weave fabric (see col. 6, lines 18-35). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin distribution medium, specifically either forming grooves in the core or providing an open weave fabric as taught by Tunis, III *et al.* ('414) in the process of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) because, Tunis, III *et al.* ('414) specifically teach that a resin distribution provides for improved resin flow that improves interlaminar shear strength, hence improving product quality.

In regard to claims 47 and 49, Tunis, III *et al.* ('414) teaches that said grooves have a depth of 0.125 mm (3.175 mm) (see col. 5, lines 30-35). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin distribution medium, specifically either forming grooves having a depth of 0.125 inches (3.175 mm)

in the core or providing an open weave fabric as taught by Tunis, III *et al.* ('414) in the process of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) because, Tunis, III *et al.* ('414) specifically teach that a resin distribution provides for improved resin flow that improves interlaminar shear strength, hence improving product quality.

Specifically regarding claim 48, Tunis, III *et al.* ('414) teaches that said grooves have a width of 0.5 inches (12.7 mm) to 0.125 inches (3.175 mm) (see col. 5, lines 24-35) and a spacing of 1 inch (25.4 mm). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin distribution medium, specifically either forming grooves having a width of width of 0.5 inches (12.7 mm) to 0.125 inches (3.175 mm) and a spacing of 1 inch (25.4 mm) in the core or providing an open weave fabric as taught by Tunis, III *et al.* ('414) in the process of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) because, Tunis, III *et al.* ('414) specifically teach that a resin distribution provides for improved resin flow that improves interlaminar shear strength, hence improving product quality.

10. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway (US Patent No. 5,080,850) in view of Calapp *et al.* (US Patent No. 5,746,955) and in further view of Darrieux *et al.* (US Patent No. 5,571,357) and WO 98/30374.

Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) teach the basic claimed process as described above.

Regarding claim 39, Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) do not teach a retainer. WO 98/30374 teach the use

of a tackifier (retainer) between fiber reinforced layers to form a preform prior to subjecting said tackified fiber reinforced preform to a resin transfer molding process (see page1, line 7-9 and page 2, lines 22-29). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a tackifier (retainer) as taught by WO 98/30374 in the process of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357) because, WO 98/30374 specifically teaches that a tackifier (retainer) provides for improved preforms to be used in a resin transfer molding process such as that of Holloway ('850) in view of Calapp *et al.* ('955) and in further view of Darrieux *et al.* ('357), hence providing for an improved molded product.

Response to Arguments

11. Applicants' remarks filed December 2, 2004 have been considered, but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

Stefan Staicovici

Primary Examiner 12/9/04

AU 1732

December 9, 2004